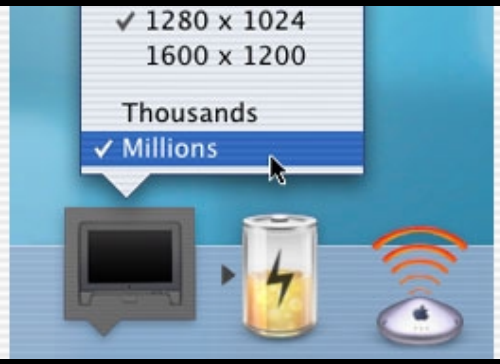
Session 700

Mac OS X Tools Overview



Godfrey DiGiorgi
Technology Manager, Development Tools

Welcome!

Welcome!

- Mac OS X creates opportunities
  - Both applications and tools

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- Developer tools are essential to all

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- Mac OS X is a premier development platform

Welcome!

- Mac OS X creates opportunities
  - Both applications and tools
- Developer tools are essential to all
- Mac OS X is a premier development platform
- Apple is SERIOUS about developer tools

What We'll Cover

- Apple's Developer Tools Goals and Strategy
- An overview of the Apple tools
- A look at third-party offerings

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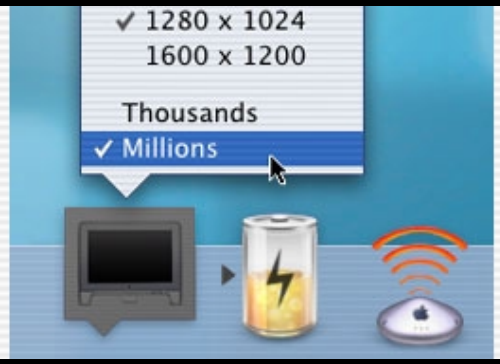
Apple Developer Tools Goals and Strategy



Steve Naroff
Senior Director, Java and Core Tools

Apple's Tools Goals

- Ensure great tools that meet developer needs
  - Support all Mac OS X platform initiatives
  - A comprehensive Apple tools strategy
  - Collaborate and assist Third-Party tool vendors
    - Strong support for Mac OS X development
- Set up feedback mechanisms
- Be responsive

Apple's Tools Strategy

- Create and deliver great tools
  - Build a strong team
  - Solicit and respond to developer feedback
- Support all Mac OS X platform initiatives
  - Live on our own tools and enable others to also
- How?
  - Create a great IDE as the centerpiece
  - Leverage and contribute to open source

“Sweet Spots”

	Cocoa	Carbon		Java
		Mac OS 9	Mac OS X	
Project Builder	X		X	X
Interface Builder	X	X	X	
CodeWarrior		X	X	X
JBuilder				X
REALbasic		X	X	
Absoft Pro FORTRAN		X	X	

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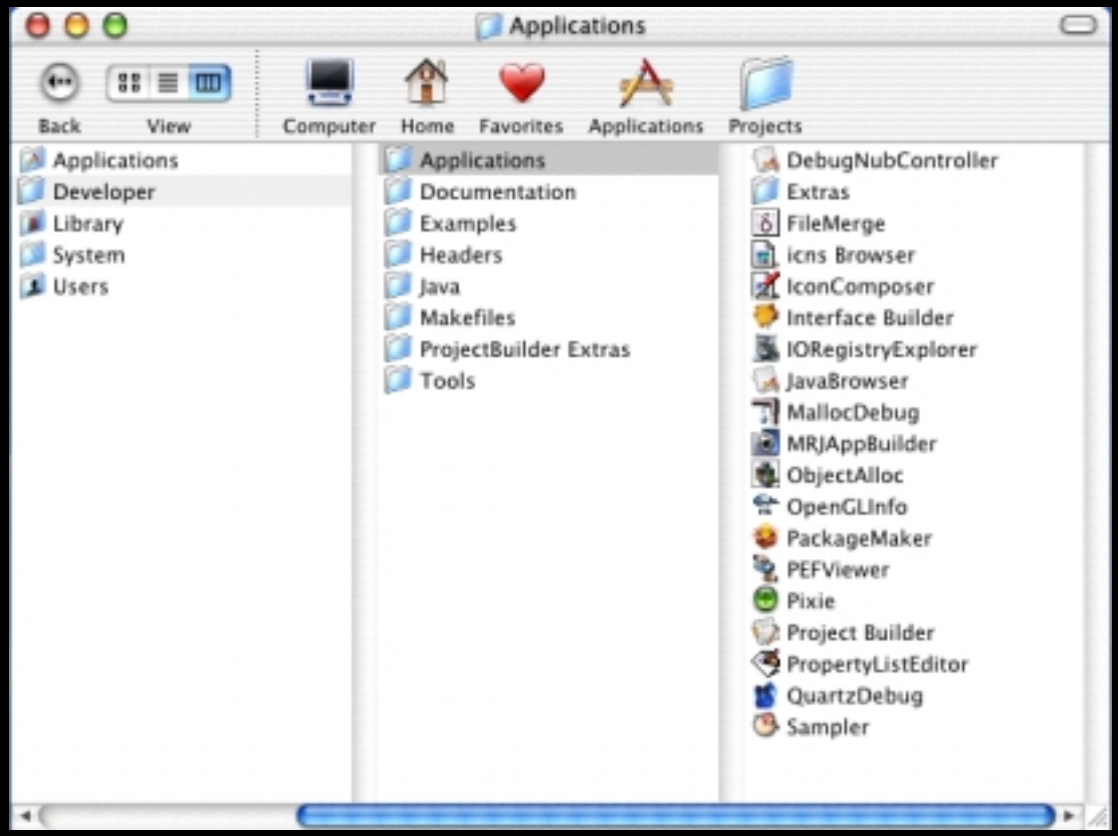
Apple's Developer Tools

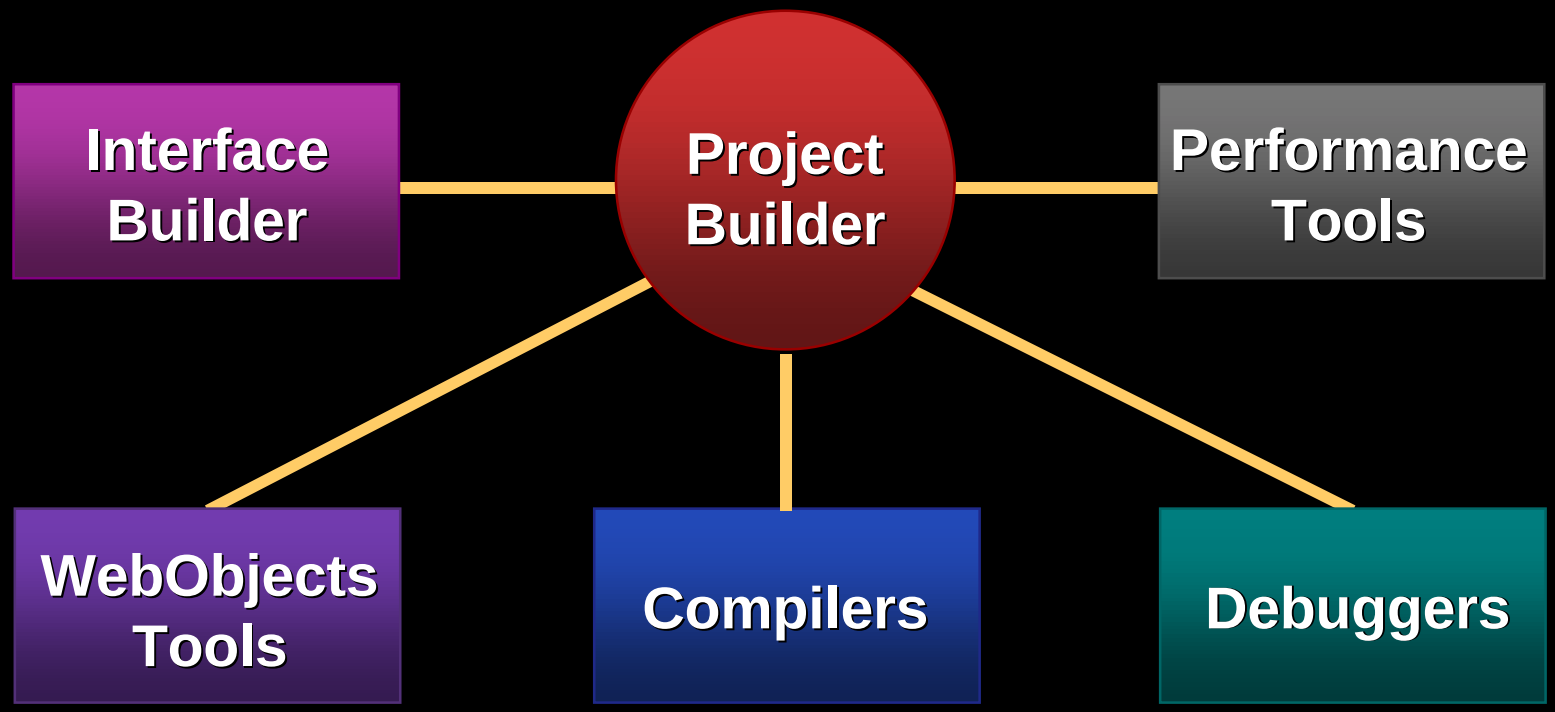
Dave Payne
Manager, Development Environment Team

Apple's Mac OS X Developer Tools

A full suite in /Developer/Applications

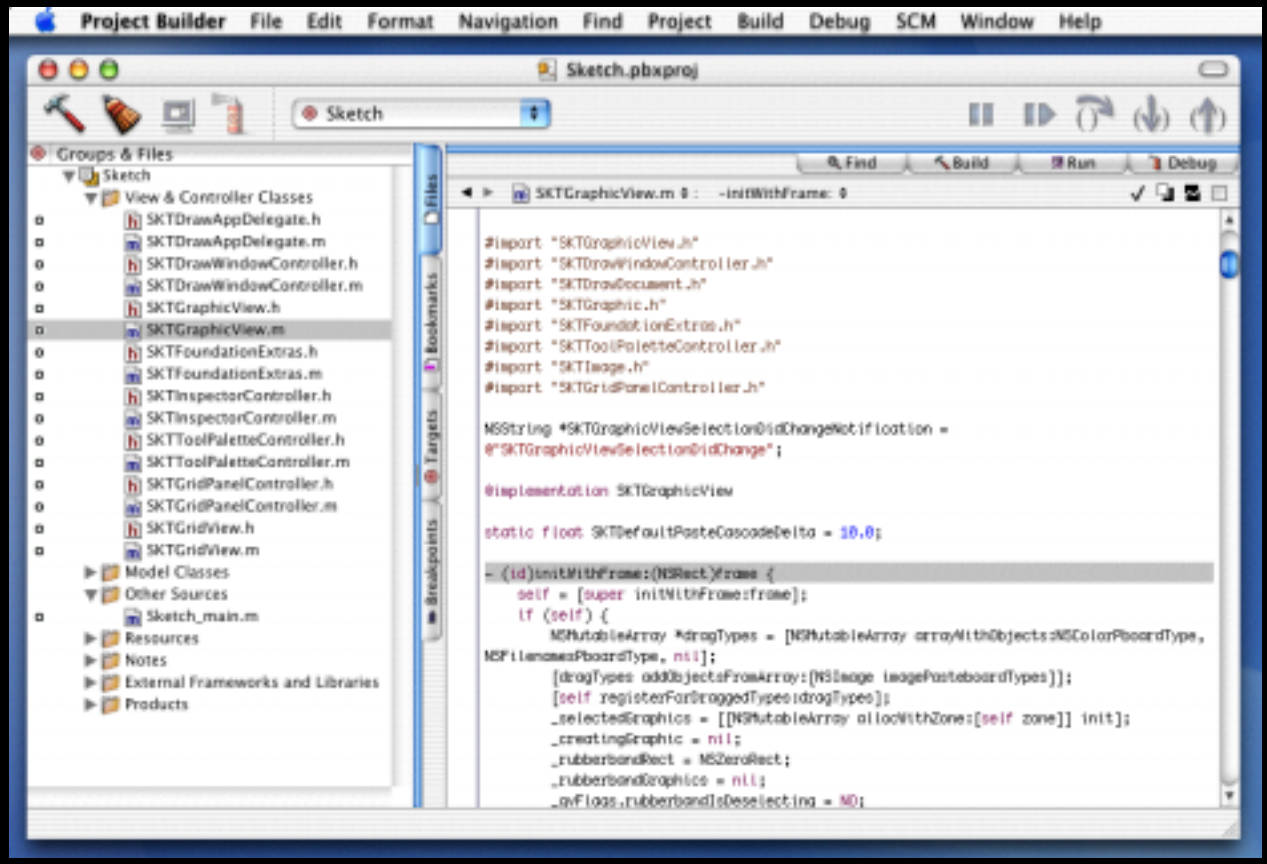


Project Builder—
Your Development Hub



Project Builder

Apple’s integrated development environment



Project Builder IDE Features

- Flexible project layout and editing
- Project navigation mechanisms
- Source code management
- Powerful build system
- Source-level debugging

Developing With Project Builder

A wealth of opportunity!

- Use a variety of technologies…
  - C, C++, Objective-C, Java
  - Cocoa, Carbon, Java 2, WebObjects
  - BSD/POSIX, IOKit

- …to build a variety of software
  - Applications, frameworks, plug-ins, tools, jars, applets
  - Kernel loadable modules and device drivers

Project Builder Is Industrial Strength

- Used by over 250 projects in Mac OS X at Apple
- Facilitates team development
  - App preferences for each user
  - Project settings for each user
  - Integrated with CVS Source Code Management
- A great front-end on the power of UNIX
- GCC compiler builds all of Mac OS X

Leveraging Open Source

- gcc compiler
- gdb debugger
- jam build tool
- cvs version control
- diff file comparison
- Many other BSD and GNU tools

Project Builder—Tailored for Mac OS X

Study "Inside Mac OS X: System Overview"

- Builds properly-formed "bundles"
  - Application packages, plug-ins, frameworks
  - Multiple localizations of resource data
  - Writes Resource Manager resources into flat data files
- Generates primary binary format—Mach-O
  - Provides direct access to all system APIs
  - Enables full use of Apple's Mac OS X tools

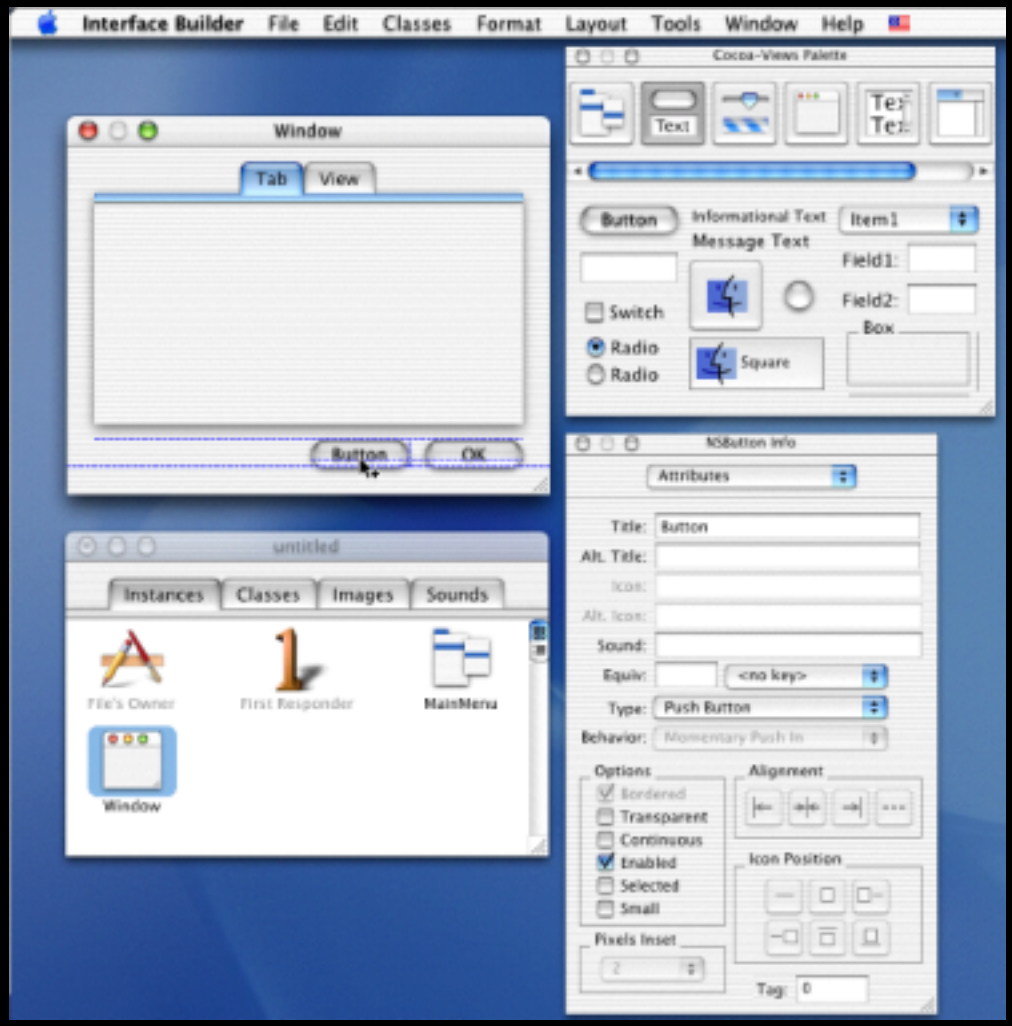
Using Frameworks in Project Builder

A fundamental concept

- Frameworks are Mac OS X's shared libraries
- Full access to system frameworks
  - Inclusion and searching of header files
  - Precompiled headers for umbrella frameworks
  - Direct access to API documentation
- Build and use your own frameworks
- Debug apps with your development frameworks

Interface Builder

Build Aqua-Compliant User Interfaces for Cocoa and Carbon

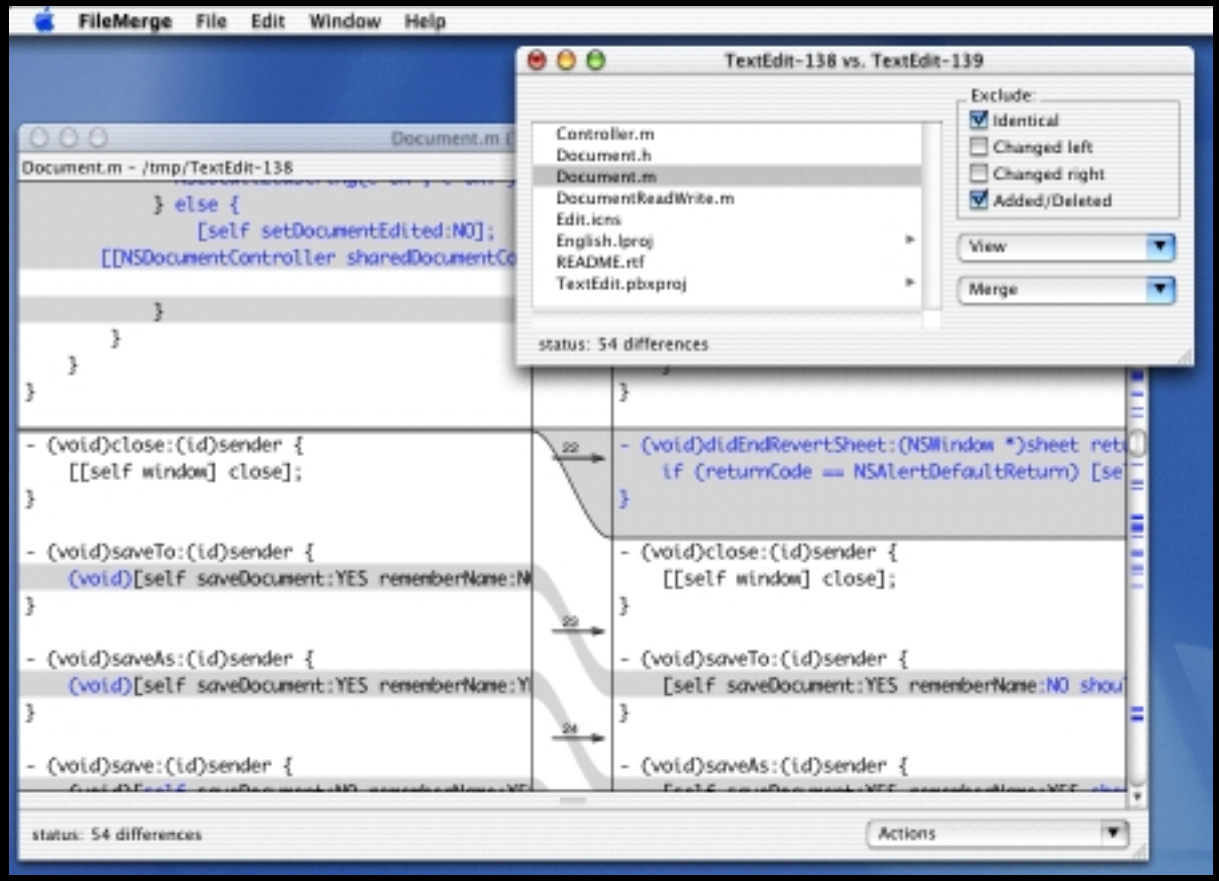


Interface Builder Features

- Creates Aqua compliant UI
- Integrated with Project Builder
- Cocoa
  - Easy to use Outlets and Actions paradigm
- Carbon
  - Supports all Carbon UI elements
  - Easiest way to use the Carbon Event Model
  - Unicode compliant (UTF-8)

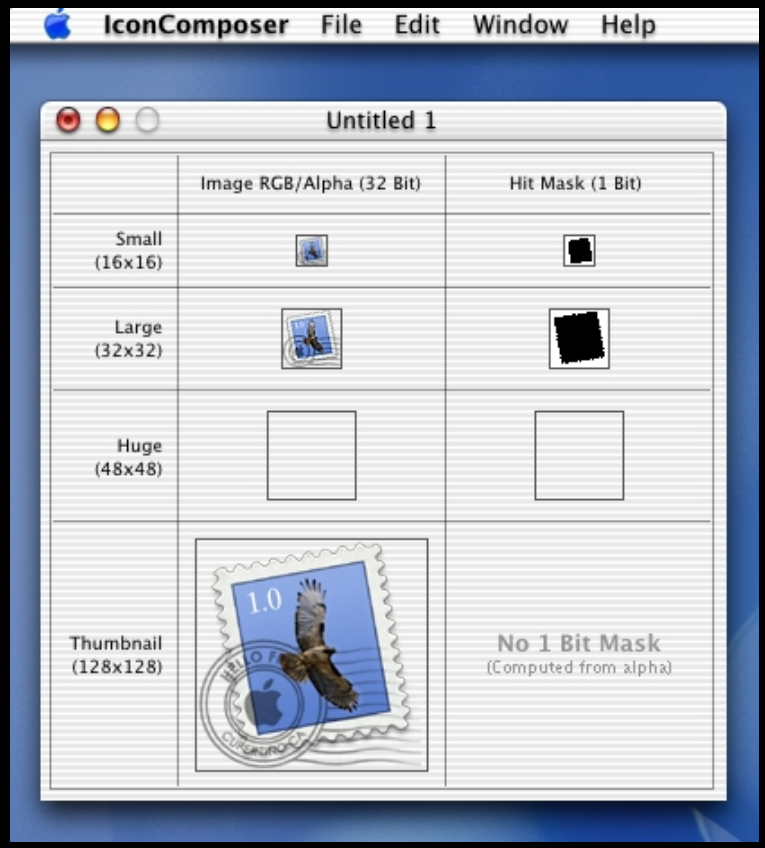
FileMerge

Compare directories of text and nib files



IconComposer

Compose images into .icns icon files



Performance Analysis Tools

Execution behavior	Heap use	System state
Sampler, sample	MallocDebug, ObjectAlloc, heap, leaks, malloc_history	QuartzDebug fs_usage, sc_usage, vmmap, top

Delivery of Apple's Developer Tools

- Developer Tools CD ships with Mac OS X
- Quarterly release of new Developer Tools CDs
  - Free to all ADC Premier and Select members
  - Packages downloadable from:
    - **http://developer.apple.com/tools/projectbuilder**
- First quarterly update (May 2001) is here at WWDC

Developer Tools CD Contents

- Apple's developer applications
- Open source tools
- Mac OS X SDK
  - Headers, profile and debug libraries…
- Sample code
- Documentation
  - System concepts, frameworks, tutorials, and man pages
- CarbonLib SDK for Mac OS 8 and 9

May 2001 Developer Tools CD

- Project Builder and Interface Builder Enhancements
  - Full support for WebObjects 5
  - Java build support enhancements
- WebObjects 5 Developer—special on WWDC CD
- New documentation
- Additional examples

New and Updated Documentation

- System conceptual documentation
  - Inside Mac OS X: Performance
  - Accessing Hardware
  - Quartz Primer
- Updated framework documentation
  - New Cocoa and Carbon spec sheets

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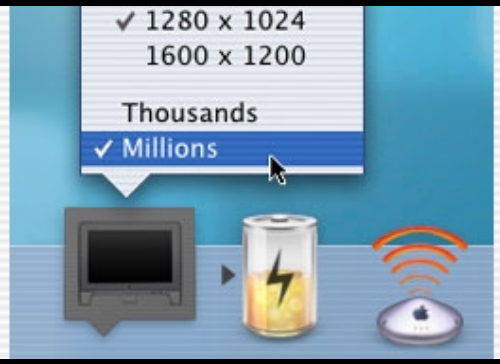
Third-Party Tools



Godfrey DiGiorgi
Technology Manager, Development Tools

Collaboration

- Work closely with third-party tool vendors
  - Engineering directions
  - Early seeding
  - Business coordination

- Available and coming soon Mac OS X tool products…

Development Environments

Absoft Corporation
Pro Fortran
www.absoft.com

Metrowerks
CodeWarrior Pro
www.metrowerks.com

REAL Software
REALbasic
www.realsoftware.com

Installers and Utilities

Aladdin Systems
InstallerMaker
www.aladdinsys.com

MindVision
Installer VISE
www.mindvision.com

Mathemaesthetics
Resorcerer
www.mathemaesthetics.com

Java Tools

Zero G
InstallAnywhere & PowerUpdate
www.zerog.com

VM Gear
Optimize It!
www.vmgear.com

Borland
Jbuilder
www.borland.com

Only a Sampling

- Many other tools are…
  - Ready now
  - On the way

Visit the WWDC Exhibit Fair!

- Monday 6:00amto 9:00pm
- Tuesday 8:30am to 6:00pm
- Wednesday 8:30am to 6:00pm

The BASIC Challenge

- BASIC delivers a LOT of applications in use today
- Visual BASIC: incredibly successful on Windows
  - Rapid Application Development
  - Ease of Access
- A Mac OS X Solution…

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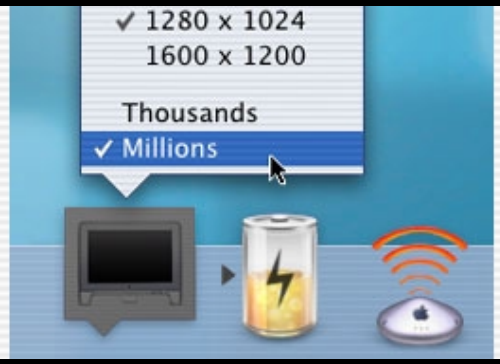
REALbasic for Mac OS X



Lorin Rivers
Product Manager, REAL Software, Inc.

Mac OS X Is the Future …I mean NOW!!!

- REALbasic has supported Mac OS X since WWDC 2000
- 3.0 shipped before Mac OS X 10.0
  - 2 free updates since then

Managing the Transition

- Mac OS X—not just for Early Adopters
- Mac OS 9 and earlier—not just for fuddy-duddies
- Transition like PowerPC adoption—a huge opportunity for developers

REALbasic's Platform Support

	Classic	Mac OS X	Win32
68k	IDE & Compiler	Compiler	Compiler
PPC	IDE & Compiler	IDE & Compiler	Compiler

- Runs on Macintosh and Mac OS X
- Compiles for Macintosh, Mac OS X, and Windows

Why REALbasic?

- Create

Why REALbasic?

- Compile

Why REALbasic?

- It rocks
  - It's professional-strength!
  - Completely Object-Oriented
  - Direct access to the Mac Toolbox and PPC Shared Libraries
  - SQL
  - AppleEvents, AppleScript, QuickTime

Why REALbasic?

- Prototyping
  - Mac Business Unit
    Microsoft & Office
    Internet Explorer

Why REALbasic?

- Utilities in a larger context
  - MYOB Account Edge
    - Needed a converter from QuickBooks to MYOB that worked on Mac OS X and Macintosh
    - Primarily native REALbasic code with one core portion, the engine, written in C as a plug-in

Why REALbasic?

- Separating UI and “Engine”
  - REALbasic provides the cross-platform framework
  - Rich Plug-in SDK provides ability to leverage C code, color outside the lines

Why REALbasic?

- RAD
  - Drag and drop controls into the Window editor
  - Instant results—what you see is what you get
    - One project, one UI…
    - REALbasic compiles native UIs for all platforms

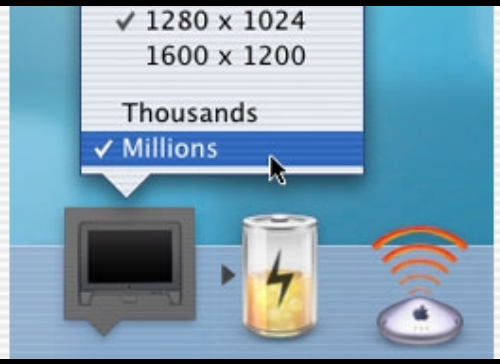
Why REALbasic?

- Productivity and Fun
  - Concentrate on *your* added value
  - Get more work done
  - Use a friendly and powerful tool

The Future

- Optimizing the compiler
  - Enhanced performance
- Optimizing the linker
  - Smaller applications
- Targeting additional platforms
  - E.g., Palm OS
- Creating plug-ins for other applications
  - E.g., Photoshop

Demo



REALbasic for Mac OS X

Who to Contact

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REAL Software, Inc.
lrivers@realsoftware.com

For More Info

Real Software
www.realsoftware.com

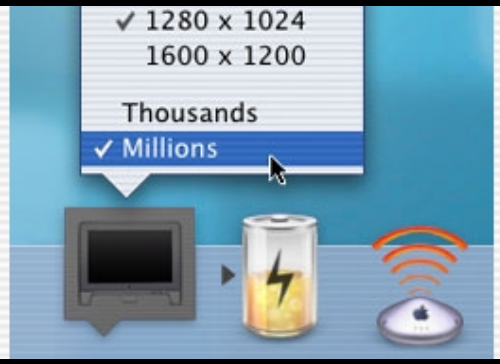
Come to the Birds of a Feather
Room A2, Tuesday evening, 6:30pm–7:30pm

Working With Metrowerks

- Leading third-party supplier of Mac OS development tools
- Moving forward together into Mac OS X…

Session 700

CodeWarrior



Matt Henderson
Tech Lead, CodeWarrior Mac OS X Tools

Introduction

- The purpose of this session is to bring you up to date on the current status and future direction of CodeWarrior on Mac OS X
  - Updated CodeWarrior Tools
  - New CodeWarrior Tools
  - CodeWarrior Pro 7 Early Access
  - Future Directions

Updated Tools—Debugging

Improved PEF debugging

- Works with shipping version of Mac OS X
- Better performance
- More reliable
- No longer needs DebugNub or MetroNubX
- Debugging shared libraries works
- Working with Apple to improve performance

Mach-O debugging

- Uses STABS for symbolics

Updated Tools—IDE

New Mac OS X features

- Handles untyped files
- Supports Mac OS X frameworks
  - Frameworks can be added to projects
    - Access new APIs only provided as frameworks
    - Link against any framework library
  - Supports new framework #include syntax
    - #include <Carbon/Carbon.h> now supported
    - Backwards compatibility: #include <Carbon.h> still works

Updated Tools—IDE

New Mac OS X features

- Converter to easily update existing projects to build Mac OS X bundles
  - Generates bundle directory structure
  - Creates ‘plst’ resource
  - Creates Mach-O targets

Updated Tools—MSL

- Supports long file names and other HFS+ features
- For Mach-O, uses Apple's ANSI C implementation from System.framework

Updated Tools—PowerPlant

- Builds for Mach-O
- More Aqua fixes
- New Constructor
  - Supports flat resource files

Updated Tools—PEF Compiler/Linker

- PEF Compiler
  - New optimizations for PPC 7450
- PEF Linker
  - Supports flat resource files
  - Supports building application bundles

New Tools—Mach-O Compiler and Linker

- Mach-O Compiler
  - Compiler uses same C/C++ front end
  - No source changes necessary
- Mach-O Linker
  - Based on Apple's Darwin linker
  - Outputs STABS for debugging symbolics
  - New Metrowerks linker coming soon

CW Mac 7 Early Access

- Pre-release software—don't use for production development!
- Contains all the tools mentioned before
- Contains new example code for Mach-O, Carbon, and Cocoa

Future Directions

- Compiler/Linker
  - Cocoa/Objective-C support
  - New MW Mach-O linker
    - Based on proven MW linker technology
    - Faster linking
    - Dead stripping of unused code
    - Outputs SYM debugger symbolics

Future Directions

- IDE
  - Long filename support
  - Integration with Interface Builder
    - Carbon
    - Cocoa Obj-C/Java
  - Improved UI
  - Improved Performance

Future Directions

- Debugger
  - Make Mac OS X debugging work as well as Classic Mac OS debugging
  - Support for viewing opaque data types
  - Support for calling functions while debugging

Future Directions

- PowerPlant
  - Adoption of new Mac OS technologies
    - Aqua
    - Carbon Events
    - MLTE
    - Data Browser

Who to Contact

Matt Henderson
Tech Lead, CodeWarrior
Mac OS X Tools, Metrowerks
mhenders@metrowerks.com

Joe Hayden
Engineering Director,
Macintosh Tools, Metrowerks
jhayden@metrowerks.com

Metrowerks feedback
pro7ea_bugreport@lists.metrowerks.com

For More Info

Metrowerks Corp.
www.metrowerks.com

Metrowerks Lunch Presentation
Civic Auditorium, Wednesday, 12:30pm–1:30pm

Summing Up

- Mac OS X development tools are healthy!
  - Apple tool suite
    - Ready now
    - Sustained, rapid development
  - 3rd-Party tool developer products
    - Ready now
    - Lots more coming

Get your applications to customers!

Information Resources

- Information pages for all Mac OS X tools
  http://developer.apple.com/tools/

- Apple's mailing list master page
  http://lists.apple.com/

  Mailing lists:
  - **projectbuilder-users**
  - **cocoa-dev**
  - **carbon-dev**
  - **java-dev**

Roadmap—Tools Related Sessions

701 Project Builder Introduction: Apple's IDE for Mac OS X!	Hall 2 **Tues., 2:00pm** **<NEXT!>**
603 Introduction to WebObjects Tools	Civic **Tues., 3:30pm**
702 Interface Builder: Apple's UI design tools for Mac OS X	Hall 2 **Tues., 3:30pm**
703 Project Builder In-Depth: Techniques for using Project Builder	Room A2 **Wed., 9:00am**
503 Java Development Tools: Tools for the Java developer	Room A1 **Wed., 10:30am**

Roadmap—Tools Related Sessions

114 Application Packaging & Document Binding	Hall 2 **Wed., 5:00pm**
704 Compiler Technologies: Learn about what Apple is doing in GCC	Room A2 **Thurs., 10:30am**
705 Apple Performance Tools: Learn how to make your application scream!	Room A2 **Thurs., 5:00pm**
129 Mac OS X Application Localization	Room C **Thurs., 3:30pm**
706 Debugging on Mac OS X: Debugging with Project Builder & GDB	Hall 2 **Fri., 9:00am**

Roadmap—Tools Related Sessions

707 Darwin Documentation Project & Header Doc	Room A2 **Fri., 10:30am**
708 C++ Frameworks for Mac OS X: Take advantage for Carbon development	Room C **Fri., 2:00pm**
FF119 Apple Developer Tools Forum: Give your feedback to the tools team!	Room J1 **Fri., 3:30pm**

Who to Contact

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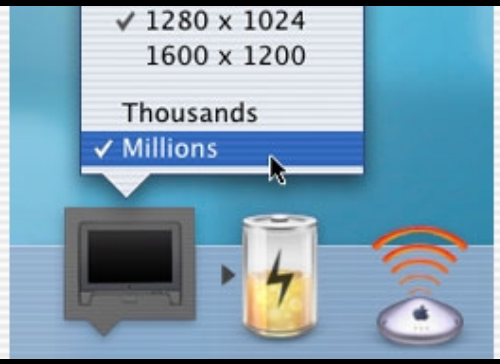
macosx-tools-feedback@group.apple.com
Mailing address for feedback

Q&A



Godfrey DiGiorgi
Technology Manager for Development Tools
ramarren@apple.com

http://developer.apple.com/events/urls.html

WWDC

Worldwide Developers Conference 2001